User Manual

Version 13 December 2017

PROFI-25xx



Written by Eric Du
Edited by Julia Wang

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1. Introduction

1.1 Overview

PROFIBUS is an open, digital communication system with a wide range of applications, particularly in the fields of factory automation and process automation. PROFIBUS is suitable for both fast, time-critical applications and complex communication tasks. PROFIBUS-DP is a famous protocol that enables simple, fast, cyclic and deterministic process data exchange between Master and assigned Slave.

The PROFI-2510 is a PROFIBUS repeater used to establish a physical coupling of two or more segments of a CAN bus system. According to the PROFIBUS specification, up to 32 PROFIBUS devices are allowed per segment. Connecting via PROFI-2510, the division of a PROFIBUS system into several subsystems increases the maximum number of bus nodes.

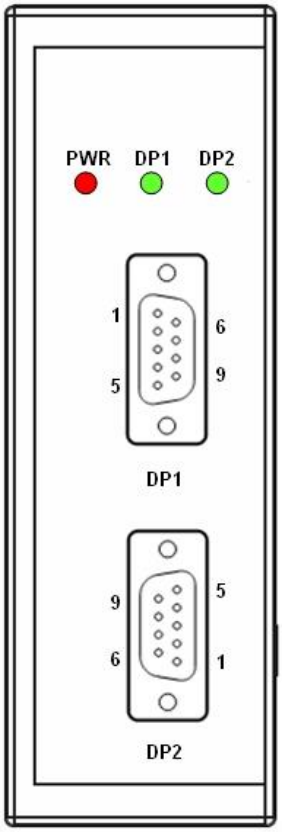
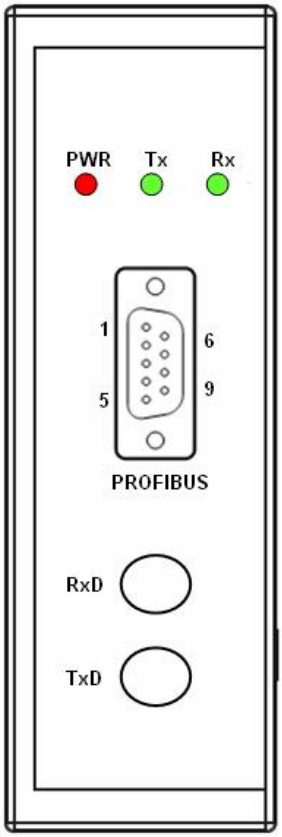
The PROFI-2541(SC) / PROFI-2542(SC) are PROFIBUS to Fiber Converters and they are the economic solution for applications which require protecting the data transmission from electrical exposure, surges, lightning or chemical corrosion.

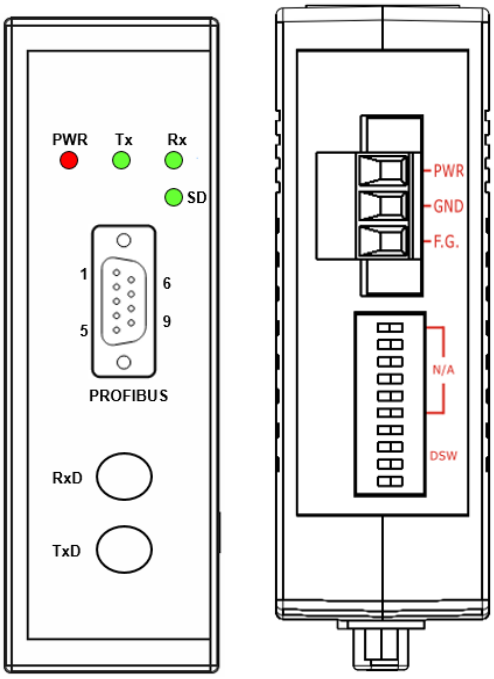
1.2 Product Information

Type	Model	Description
Repeater	PROFI-2510	Isolated PROFIBUS Repeater
Converter	PROFI-2541	PROFIBUS to Fiber Converter(ST Type)
	PROFI-2541-SC	PROFIBUS to Fiber Converter(SC Type)
	PROFI-2542	PROFIBUS to Single mode Fiber Converter(ST Type)
	PROFI-2542-SC	PROFIBUS to Single mode Fiber Converter(SC Type)

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1.3 Specification

PROFI-2510	PROFI-2541(SC)
	

PROFI-2542(SC)


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1.4 Features

- **PROFI-2510**

Protocol	PROFIBUS DP
Supports Transmission Rate (Kbps)	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000
Transmission Rate Setting	detected automatically
Indicators	PWR LED, DP1 LED and DP2 LED
ESD Protection	4kV class A
Network Isolation Protection	High Speed iCoupler
DC Isolation Protection	3000VDC on PROFIBUS side

- **PROFI-2541/ PROFI-2541-SC**

Protocol	PROFIBUS DP
Supports Transmission Rate (Kbps)	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000
Transmission Rate Setting	detected automatically
Indicators	PWR LED, TxD LED and RxD LED
Fiber Wave Length	850 nm
Fiber Type	ST / SC(Multi-Mode)
ESD Protection	4KV class A
Network Isolation Protection	High Speed iCoupler
DC Isolation Protection	3000VDC on PROFIBUS side

- **PROFI-2542/ PROFI-2542-SC**

Protocol	PROFIBUS DP
Supports Transmission Rate (Kbps)	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000
Transmission Rate Setting	detected automatically
Indicators	PWR LED, TxD LED, RxD LED and SD LED
Fiber Wave Length	1310 nm
Fiber Type	ST / SC(Single-Mode)
ESD Protection	4KV class A

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Protocol	PROFIBUS DP
Network Isolation Protection	High Speed iCoupler
DC Isolation Protection	3000VDC on PROFIBUS side

1.5 Specifications

- **PROFI-2510**

PROFIBUS Interface	9-pin D-Sub(Female)
PROFIBUS Transceiver	ADI ADM2486 iCoupler Isolated transceiver
Transmission Rate	Up to 12Mbps
Power Requirement	10V ~ 30V
Power Consumption	1W
Operating Temp.	-25℃ ~ +75℃
Storage Temp.	-30℃ ~ +85℃
Humidity	5% ~ 95%(Non Condensing)
Dimensions	33 mm x 126.8 mm x 93.4 mm (W x L x H)

- **PROFI-2541/ PROFI-2541-SC**

PROFIBUS Interface	9-pin D-Sub(Female)
PROFIBUS Transceiver	ADI ADM2486 iCoupler Isolated transceiver
Transmission Rate	Up to 3Mbps
Power Requirement	10V ~ 30V
Power Consumption	1W
Connector	ST / SC(Multi-Mode)
Wave Length	850 nm
Fiber cable	62.5 / 125 μm
Propagation Delay	125ns max (125ns delay shortens bus line length by ~ 25 m)
Transmission Distance	1.4 km max (in 62.5/125 μm fiber cable)
Operating Temp.	-25℃ ~ +75℃
Storage Temp.	-30℃ ~ +85℃
Humidity	5% ~ 95%(Non Condensing)
Dimensions	33 mm x 126.8 mm x 104.5 mm (W x L x H)

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- **PROFI-2542/ PROFI-2542-SC**

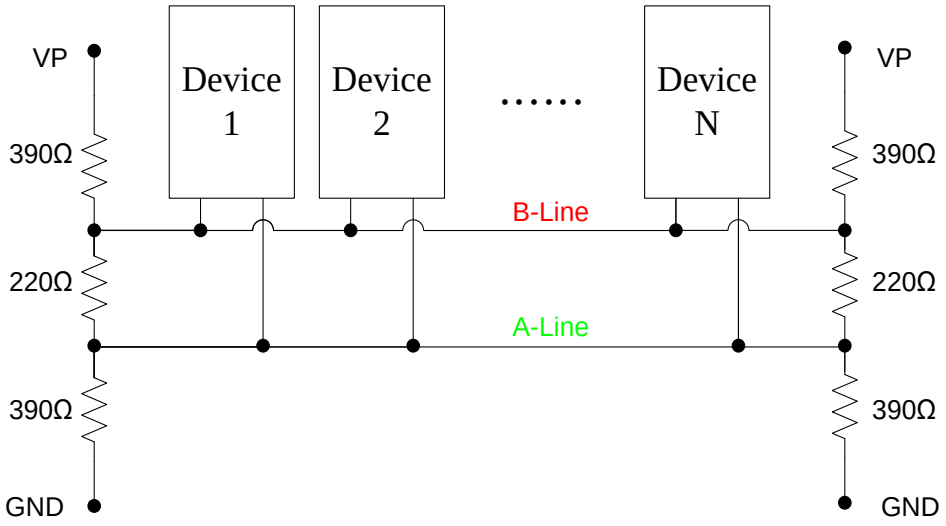
PROFIBUS Interface	9-pin D-Sub(Female)
PROFIBUS Transceiver	ADI ADM2486 iCoupler Isolated transceiver
Transmission Rate	Up to 12Mbps
Power Requirement	10V ~ 30V
Power Consumption	1W
Connector	ST / SC(Single-Mode)
Wave Length	1310 nm
Fiber cable	9/125 μm recommended
Transmission Distance	10km max (indicative only)
Operating Temp.	-25℃ ~ +75℃
Storage Temp.	-30℃ ~ +85℃
Humidity	5% ~ 95%(Non Condensing)
Dimensions	33 mm x 126.8 mm x 104.5 mm (W x L x H)

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2. Hardware

2.1 Bus Wiring

In order to minimize the reflection effect of the signal transmission, PROFIBUS device has to fit with an active terminal resistor at both first node and last node, as shown below.



However, the number of station in PROFIBUS network is also restricted. According to PROFIBUS specification, it is up to 32 stations connected in a PROFIBUS segment. If more than 32 stations are connected, the PROFIBUS repeater must be used to link the individual bus segments.

2.2 PROFIBUS Cable and Transmission Distance

The PROFIBUS cable with following properties has different transmission distance with respect to different transmission rate, shown in the following table

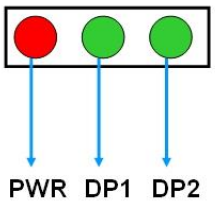
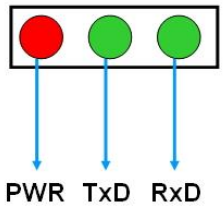
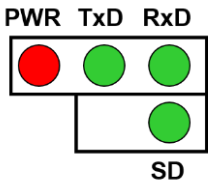
1. Impedance :135~165Ω
2. Capacity : lower than 30 pF/m
3. Loop resistance : lower than 110Ω/Km
4. Wire diameter : larger than 0.65mm
5. Core cross-section : larger than 0.34mm^2

Transmission Rate(Kbps)	Transmission Distance per Segment (meter)
9.6, 19.2, 45.45, 93.75	1200
187.5	1000

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Transmission Rate(Kbps)	Transmission Distance per Segment (meter)
500	400
1500	200
3000, 6000, 12000	100

2.3 Status Indicator

PROFI-2510	PROFI-2541(SC)	PROFI-2542(SC)
		

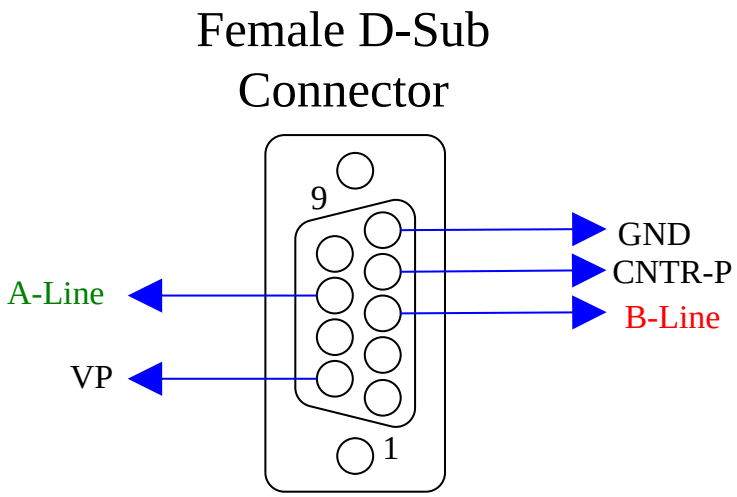
It provides three status indicator, In PROFI-2510, they are PWR LED (red),DP1 LED(green) and DP2 LED (green). In PROFI-2541(SC) / PROFI-2542(SC), they are PWR LED (red), TxD LED(green) and RxD LED (green). When the power is supplied to module, PWR LED will turn on; Transmitting/receiving one data to/from fiber cable will flash the DP1/DP2/TxD/RxD LED once. The DP1/DP2/TxD/RxD LED may always be turned on if there are a lot of data transmitted on fiber cable.

		PROFI-2510	PROFI-2541(SC)	PRPOFI-2542(SC)
PWR (Red)	ON	Module Active		
	OFF	Module Inactive		
DP1 (Green)	Flashing	Data Transmitting	N/A	
	OFF	No Data Transmitting	N/A	
DP2 (Green)	Flashing	Data Transmitting	N/A	
	OFF	No Data Transmitting	N/A	
TxD (Green)	Flashing	N/A	Data Transmitting	
	OFF	N/A	No Data Transmitting	
RxD (Green)	Flashing	N/A	Data Transmitting	
	OFF	N/A	No Data Transmitting	
SD (Green)	ON	N/A		Fiber Signal Detected
	OFF	N/A		No Fiber Signal Detected

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2.4 Connector

The connector of PROFI-25xx module is shown below



Pin No.	Signal	Meaning
3	B-Line	Receive/Transmit data - plus
4	CNTR-P	Repeater control signal, RTS signal
5	GND	Power ground of active terminator
6	VP	Power 5 volt of active terminator
8	A-Line	Receive/Transmit data - minus

Note: The connector of PROFI-25xx module has no terminators; users must use the connector with the terminator inside. The power of the terminator will provide by terminal device.

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2.5 Baud rate support

PROFI-25xx module has a functionality of auto- detection for baud rates, users don't need to set the baud rate manually.

PROFI-2510 supports the entire baud rates of PROFIBUS. They are 9.6Kbps, 19.2Kbps, 45.45Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, 3Mbps, 6Mbps, and 12Mbps.

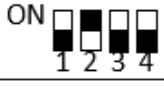
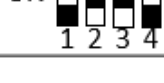
PROFI-2541(SC) supports the entire baud rates of PROFIBUS. They are 9.6Kbps, 19.2Kbps, 45.45Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, and 3Mbps.

PROFI-2542(SC) supports the entire baud rates of PROFIBUS. They are 9.6Kbps, 19.2Kbps, 45.45Kbps, 187.5Kbps, 500Kbps, 1.5Mbps, 3Mbps, 6Mbps, and 12Mbps.

Note: Many baud rates only are supported by the particular cable or speed. For the detail, please refer to the above section "**PROFIBUS Cable and Transmission Distance**"

2.6 Dip Switch

Users can set dip switch to get a better PROFIBUS signal quality in PROFI-2542(SC) module.

DSW	Baudrate (bps)
	6M, 12M
	3M
	1.5M
	500K
	187.5M, 93.75K
	45.45K
	19.2K, 9.6K

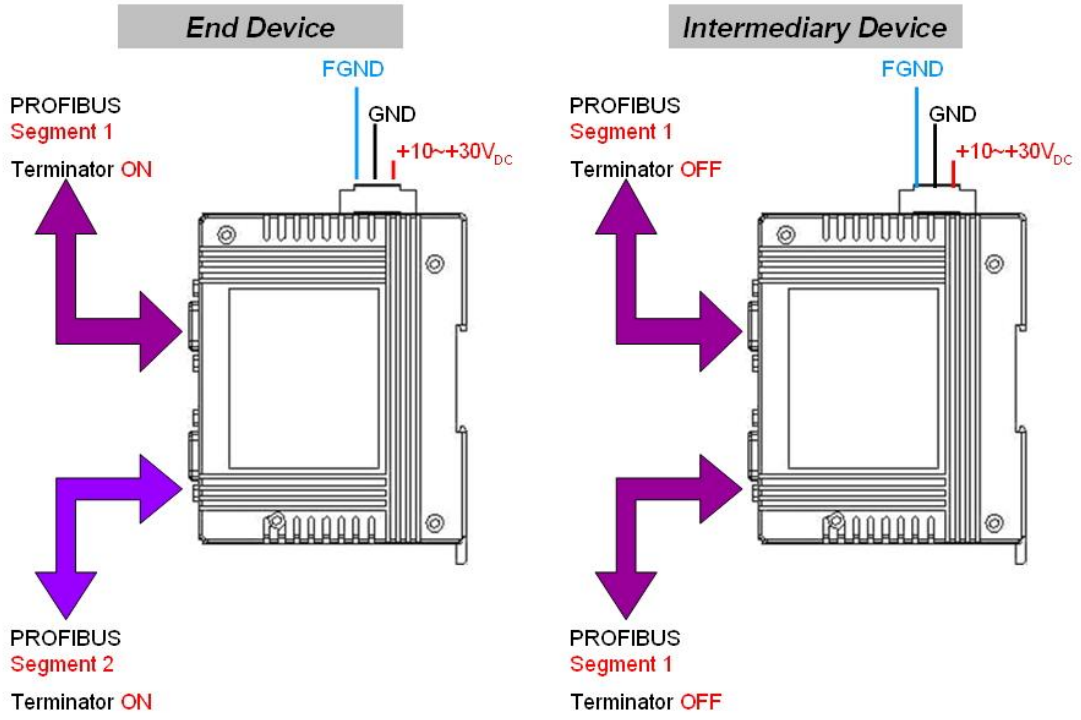
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2.7 Wire Connection

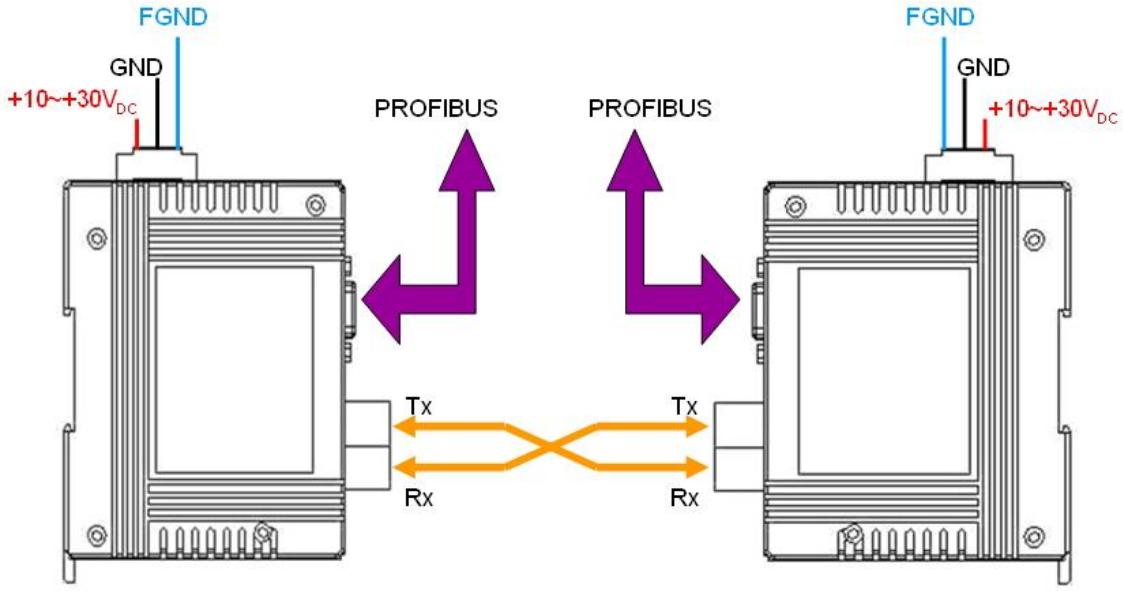
- **PROFI-2510**

  If PROFI-2510 is a end device of PROFIBUS segment 1 and PROFIBUS segment 2. The terminal resistor of segment 1 is ON. The terminal resistor of segment 2 is ON.

  If PROFI-2510 is an intermediary device of PROFIBUS segment 1. The terminal resistor of segment 1 is OFF.



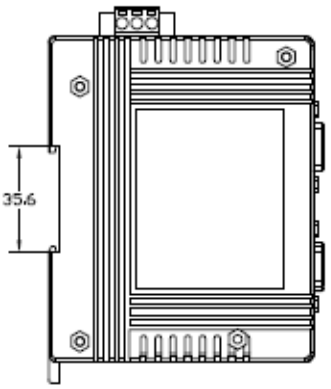
- **PROFI-2541(SC) / PROFI-2542(SC)**



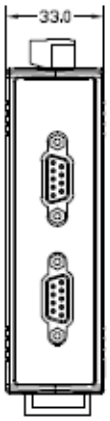
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Appendix A. Dimensions

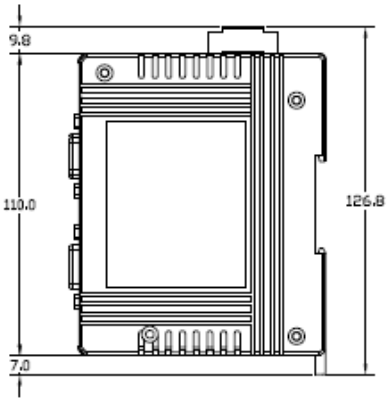
- **PROFI-2510**



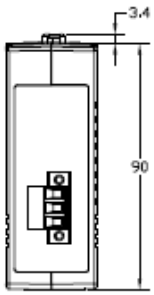
Right Side View



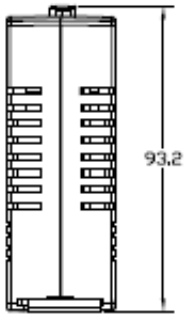
Front View



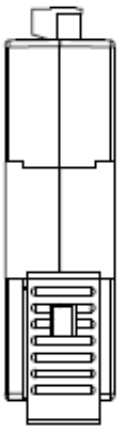
Left Side View



Top View



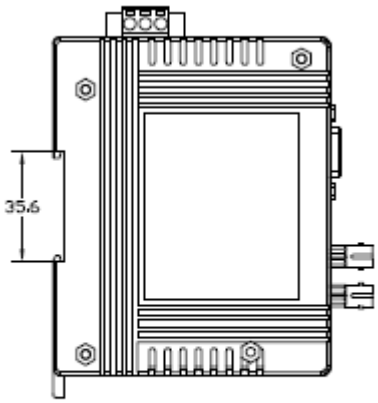
Bottom View



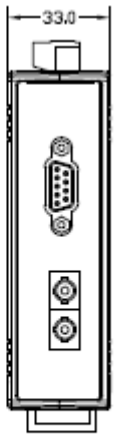
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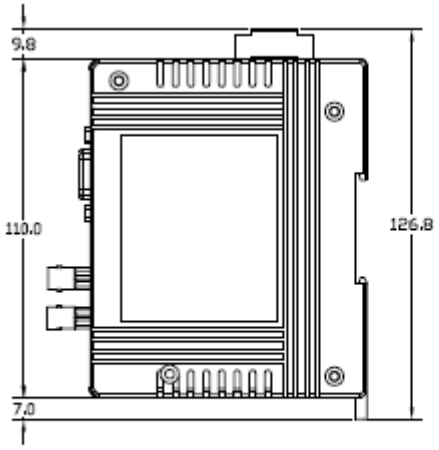
- **PROFI-2541 / PROFI-2542**



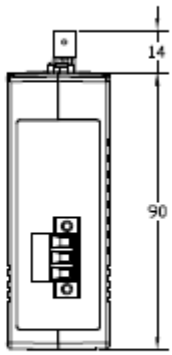
Right Side View



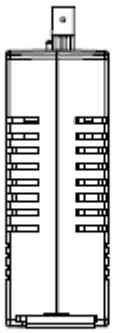
Front View



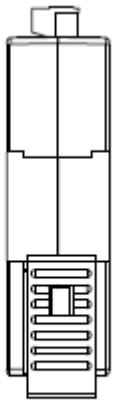
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Top View



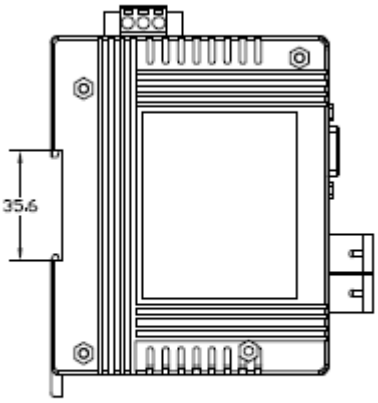
Bottom View



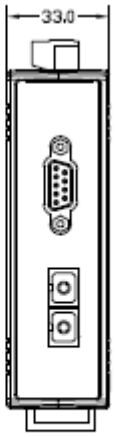
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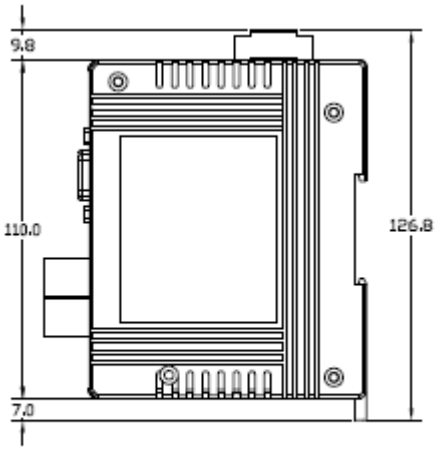
- **PROFI-2541-SC / PROFI-2542-SC**



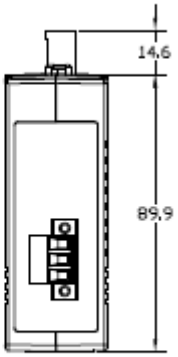
Right Side View



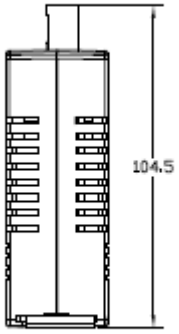
Front View



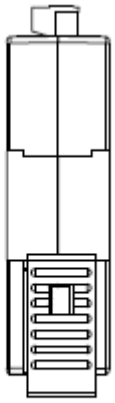
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Appendix B. Revision History

This chapter provides revision history information to this document.

The table below shows the revision history.

Revision	Date	Description
1.0	November 2011	Release
1.1	August 2014	Add PROFI-2542-SC
1.2	December 2015	Modify PROFI-2542-SC
1.3	December 2017	Add PROFI-2542

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